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Before The
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
The Development of Operational,	)	
Technical and Spectrum Requirements	)	
Fr Meeting Federal, State and Local	)	
Public Safety Communication Requirements	)	WT Docket No. 96-86
Through the Year 2010; Establishment of	)	
Rules and Requirements for Priority	)	
Access Service	)	
	)	
Fourth Notice of Proposed Rulemaking	)	

TO: The Commission

REPLY COMMENTS OF DATARADIO CORPORATION

DATARADIO CORPORATION ("Dataradio"), by its attorneys, and pursuant to the Commission's Public Notice in this proceeding released August 2, 2000, 65 Fed. Reg. 51788 (August 25, 2000), respectfully submits these Reply Comments.

1. **The Small Amount of Public Comment on Narrowband Data Issues Shows Confusion Among the Public and Lack of Understanding**

It is clear from the comments submitted in this docket that the public is generally uniformed about the proposed data standard and what would happen if it were adopted. In general, there was very little comment on the proposed data standard, and very few of the comments addressed any of the issues discussed in Dataradio's initial comments. Dataradio submits that this demonstrates that more time and consideration is needed before the Commission adopts a data interoperability standard. Certainly, there was very little public input before the NCC on this issue, as the P-25 data suite was proposed by APCO representatives for the first time and adopted by the NCC during a single meeting, without prior notice, with very little public discussion, and without even allowing full

public access to the standard documents.[1] Clearly, more consideration is needed before the Commission rushes to adopt an obsolete standard.

2. The P-25 Standard is Obsolete for Data Communications and None of the Comments Shows Otherwise

As discussed in Dataradio's September 25, 2000 comments in this proceeding, adopting the P-25 standard for the narrowband data channels would result in promulgation of an incomplete, obsolete and inefficient standard that would not be compatible with today's and tomorrow's data applications. While several commenters support adoption of the P-25 standard for the narrowband data channels, none suggest or otherwise submit any evidence that might show Dataradio's analysis is incorrect. Instead, these several commenters support adopting P-25 for the narrowband data interoperability channels mainly on the basis that it is the only *TIA-approved* standard.[2] Dataradio submits that this is not a valid reason for adopting an obsolete standard.

Even though the P-25 "data suite" is TIA-approved, having been rushed through the approval process less than a year ago as a complement to the 10-year-old P-25 voice standard, this does not override the problems of adopting this obsolete standard. Adopting the standard now would hamper development of interoperable data communications. Importantly, many public safety officials do not express support for the P-25 standard for data. As shown in their Joint Comments, the Forestry Conservation Communications Association, the International Association of Fire Chiefs, Inc., the International Association of Fish and Wildlife Agencies, the International Municipal

[1] This was fully discussed in the Dataradio Minority Report, a copy of which is attached and made a part hereof.

[2] See, e.g., "Comments of the Project 25 Steering Committee in Response to Fourth Notice of Proposed Rulemaking," pg. 5.

Signal Association, and the national Association of Foresters all question whether P-25 is the appropriate data standard.

3. There is No Interoperable Application Software for the P-25 Data Standard

As Dataradio explained in its initial Comments, data applications are not being written for the P-25 standard. No commenters disagreed or otherwise submitted evidence to the contrary. Instead, at least three commenters confirmed this fact. The comments of the State of California note that P-25 "merely provides a 'pipeline' down which data may be transferred. Significant work remains to outline and define the applications that will make data interoperability a reality."[3] The comments of the North American TETRA Forum (NATF) state that, "NATF, in a recent market review could not identify a single working application of the Project 25, Phase 1 trunked data solution."[4] The Joint Comments of the Forestry Conservation Communications Association, the International Association of Fire Chiefs, Inc., the International Association of Fish and Wildlife Agencies, the International Municipal Signal Association, and the National Association of Foresters note that in order to accomplish data exchange there will be needed "common protocols for both the common air interface as well as for the data communications protocol."[5]

The lack of applications designed for a P-25 interoperable data standard leads to the result that if the FCC moves forward with adopting the standard, it will not be promoting interoperability, but instead will be ensuring that there will be very little usage of these channels for interoperable data purposes.

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[3] "Comments of the State of California in Response to Fourth Notice of Proposed Rulemaking," pgs. 15-16.
[4] "Comments of North American TETRA Forum," pg. 10.
[5] Joint Comments, pg. 14.

4. Dataradio Supports Dedicated Data Interoperability Channels

At least one commenter, the Project 25 Steering Committee, would support the P-25 standard for data, even though it is obsolete, on the basis that adopting the P-25 standard for both voice *and* data would allow the proposed data-only channels to be used for voice communications. Indeed, the Project 25 Steering Committee puts greater importance on the need to have such flexibility in usage of the data-only channels than it places on the need for an efficient, useful, forward looking data standard. The Project 25 Steering Committee states, "Of even greater importance is the fact that Project 25 standards have been designed from their inception to allow maximum flexibility in the future. ... As stated, it will allow any selected channel within a system to be used for either voice, data, or both, as may be required."[6] This type of justification defeats the purpose of having channels designated for data only, with data being transmitted in accordance with whatever data interoperability standard is selected. Indeed, the Commission specifically recognized the need for dedicated interoperable data channels in its public notice.

But as the Project 25 Steering Committee's comments implicitly make clear, using the same standard on both sets of channels would ensure that the data-only channels would be used for voice communications, thus detracting from the development of important data communications applications and protocols for these channels. Indeed, the current lack of any data applications to be carried on the P-25 pipeline will only quicken the deployment of voice communications on these channels as a pragmatic alternative to letting the channels lie fallow. The result would be confusion, and a

[6] Comments of the Project 25 Steering Committee, pg. 5.

concomitant threat to safety during emergency situations as users would be uncertain regarding what channels are to be used for which type of communications.

5. P-25 is Not State-of-the-art for Data Communications

One commenter, the County of Orange, California, supports the adoption of the P-25 standard for the data-only channels on the basis that it would foster the development of infrastructure and because it believes that channel efficiency of 4.8 kilobits per second (kbps) per 6.25 kHz channel "is the current state-of-the-art for data transmission in a mobile environment."[7] As Dataradio and others have explained, there are no data applications for the P-25 standard and software providers cannot be expected to write applications for this backward-looking, obsolete pipeline. Thus, P-25 will hinder the development of data infrastructure. Regarding channel efficiency, Dataradio's current generation of equipment achieves 1.024 b/Hz, which unlike P-25 substantially exceeds the 0.768 b/Hz minimum standard specified by the Commission. (P-25 employs a 9600 baud rate per 12.5 kHz channel or 0.768 b/Hz, the minimum Commission standard, which is far below current state of the art technology). Of course, as several commenters pointed out, the issue with data is not so much channel width as efficiency in a given channel. Thus, a pipeline can be made narrower, and the data communications becomes slower. The important point is that current state-of-the-art data communications exceeds the efficiency of the P-25 pipeline. Thus, adopting the P-25 standard would frustrate the capability of today's and tomorrow's data communications systems, protocols and applications.[8]

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[7] Comments of Orange County, California, pg. 4.

[8] The situation would be similar to trying to put out a house fire with an ordinary garden hose rather than a large diameter fire hose.

Dataradio appreciates the opportunity to submit these Reply Comments and urges the Commission to refrain from adopting P-25 for the data interoperability channels.

Respectfully submitted,

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Minority Report on Interoperable Data
Submitted by Dataradio Corporation
In Response to the NCC February 25, 2000
Recommendations to the FCC
(March 13, 2000)

Dataradio Corporation (Dataradio) submits this Minority Report in response to the NCC's February 25, 2000 recommendations to the FCC.[1] Dataradio has participated in the last four NCC meetings with the view to assisting the NCC's efforts towards development of standards for data interoperability. As a leading manufacturer of radios dedicated exclusively to data communications, and as a major provider of data-only equipment to the public safety sector, Dataradio is well aware of the many and complex issues involved in achieving data interoperability. During the recent NCC meetings in New York City and in Washington, D.C., Dataradio sought to focus the efforts of the NCC by presenting details of some of the issues that will need to be addressed in developing data interoperability standards, and by suggesting approaches to resolving these issues.

Dataradio applauds the work of the NCC in striving to meet the FCC's mandate of developing in a short timeframe recommendations for interoperability standards. Dataradio is concerned that with regard to the recommended data standards the NCC has moved too fast and is recommending a standard that: (1) does not address the many issues involved in achieving data interoperability; (2) has not been thoroughly discussed and considered by NCC participants; (3) does not meet the forward-looking needs of data users; and (4) does not meet the FCC's mandate of developing data standards that will facilitate spectrum efficient technological advancement and promote competition among manufacturers.

An Interoperable Data Standard Has Not Been Defined

The NCC Recommendations advise the FCC to adopt the Project 25 standard for data interoperability in the narrowband channels, along with the four recently balloted TIA data standards designed to accompany the Project 25 standard.[2] These standards address only the air interface aspects of interoperability, and do not even begin to resolve the many other complex issues involved with data interoperability. True interoperability with data is much more a function of the information to be shared than of the air interface. Thus, it requires applications and pathways to share information in a common data base; likewise, messaging and other data type functions need to be commonly formatted and standardized to effect interchange. Beyond this, there needs to be a

[1] Public Safety National Coordination Committee, "Recommendations to the Federal Communicaitons Commission for Technical and Operational Standards for use of the 764-776 MHz and 794-806 MHz Public Safety Band Pending Development of Final Rules" (February 25, 2000).

[2] These are: ANSI/TIA/EIA 102.BAAA; TIA/EIA/IS 102.BAEA; TIA/EIA/IS 102.BAEB; TIA/EIA/IS 102.BAEC; and TIA/EIA/IS 102.BAEE.

command and control protocol to determine aspects such as access validation, identity verification and other operational components of the process.

Analogizing this to the world of voice communications, consider what would happen if voice users did not all speak the same language, e.g., English, but in fact spoke many different languages. With a common air interface or R/F protocol different users could speak to each other, but there would be no interoperability with one user speaking English while another speaks Spanish. While this analogy simplifies the problem that data interoperability presents, it is useful in showing where standards work is needed. The issues are application driven, and these are not addressed by the air interface. As stated by Robert Schlieman, who presented these standards during the January 27th meeting of the Subcommittee on Technology,

> Clearly, there is more required than just these four standards. There is a need to standardize an application layer to properly communicate with data. Obviously, you could send bit stream text and receive that. However, in the discussions that we had this morning, it was clear that there was a need for high accuracy.
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> And while the transmission of messages will require a high level of accuracy, more so than speech requires and also the formatting of transmissions so that the information that is communicated is useable at the opposite end, that needs some further work done on it.[3]

At most, the Project 25 standards limit the boundaries within which the future work will be able to be conducted. But the FCC should not be misled by the NCC's Project 25 recommendation – it is only a quick and easy way of beginning the process, and a great deal of work remains to be done.

It should be noted that the same principle applies to wide band data. Although the recommendation has been made to obtain the aid of the TIA in developing a wide band data standard, the same problem will persist, and that effort has not yet begun. As pointed out by the Motorola wide band data presentation during the NCC's January meeting in Washington, DC, data intercommunication is application driven and therefore the wide band interoperable standard selected must be developed in concert with recognition of that reality.[4]

Most importantly, to date there has been very little work done to identify the specific needs of data interoperability. The needs and uses for voice interoperability are obvious, i.e., to allow officers and officials from multiple agencies and different jurisdictions to have verbal communication with each other over an easily-accessible common interface. But data interoperability is more complex; and it is very much a

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[3] Remarks of Robert Schlieman, meeting of NCC Subcommittee on Technology, San Francisco, California, January 27, 2000, Minutes, pg. 5.

[4] Remarks of Tim Goodall, Motorola, Meeting of NCC Subcommittee on Technology, January 13, 2000, Washington, DC, minutes pgs. 3-36.

function of the information being shared. It is not possible to define an appropriate interoperability regime without first determining the what, why and how of data sharing, i.e., what types of data will be shared, why is there a need to share such data, and how will the shared data be put to use. Once these issues have been addressed, appropriate pathways for sharing the data will become more easily determined. To date, however, almost no work has been done to identify the uses and needs of data interoperability. The PSWAC Report touched upon the issue in only the most general way.[5] The NCC itself has not yet identified these needs and uses. Certainly, the NCC has identified the need to be able to share data, for example, directly between officers, but this does not resolve the critical what, why and how issues. Dataradio respectfully suggests that before choosing a standard that limits available options for data interoperability, the NCC should work to define specifically the uses and needs of data sharing, and then work to adopt a standard that will facilitate such operations.

The Project 25 Recommendation Has Not Been Thoroughly Considered by the NCC

The NCC began addressing the issue of data interoperability only last November at the meeting in New York City. By the time of the January 2000 meeting in Washington, DC, the NCC had still made very little progress in addressing the data interoperability standard. This was recognized in Mr. Sugrue's remarks to the NCC, where he stated, "So far the NCC has made considerable progress on recommendations for narrowband voice channels. But you have not yet addressed the matter of data transmission on the narrowband channels."[6]

Within two weeks of the Washington, DC meeting, the NCC moved from having hardly discussed the data interoperability issue, to adopting the Project 25 data suite standards during the San Francisco meetings, on January 27th and 28th. It appears that this was done with minimal consideration, without discussing possible alternatives, without addressing whether the NCC should ask TIA or ANSI to amend or change these standards in light of the NCC's own mandate from the FCC, and to a large extent without even allowing attendees at the NCC's January 27th and 28th meetings thoroughly to review the standards.

The use of the Project 25 standard for data interoperability was considered for the first time at the San Francisco meetings. It was put forward during those meetings as an appropriate data interoperability standard when combined with the accompanying suite of four additional standards that were balloted by TIA in October 1999 and are published as Interim Standards.[7] These standards were developed, balloted and approved without any

[5] *Final Report of the Public Safety Wireless Advisory Committee* (September 11, 1996).

[6] Remarks of Thomas Sugure, Chief, Wireless Telecommunications Bureau, as delivered to the meeting of the Public Safety National Coordination committee, January 14, 2000, Washington, DC.

[7] Remarks of Robert Schlieman, meeting of NCC Subcommittee on Technology, San Francisco, California, January 27, 2000, Minutes, pg. 3.

input from or consideration by the NCC. The NCC simply adopted them wholesale at the January 27 meeting. Because TIA has a copyright on the standards, they were not even available to many of the attendees at the NCC meetings; ten copies were distributed to governmental entities for the first time at the January 27 meeting of the Subcommittee on Technology.[8]

The ensuing discussion focused mainly on the need to propose something to the FCC by February 2000, and the fact that these were the only standards in existence. As Ms. Wallman pointed out in addressing the Subcommittee,

> We are under considerable time pressure as Chief Shegrew (sic.) of the Wireless Telecommunications Bureau indicated at our last meeting in Washington. The report is due at the end of February. The FCC does expect some advice based on what is available in the art and practice on data standards. ... I think at the moment we have to find a way to do the best we can with the available standards documents ... .[9]

Further, Mr. Schlieman commented,

> Trying to come up with recommendations for a data standard in less than two weeks is a bit of an unrealistic task. But since these standards have already been developed for use with the ANSI 102 series equipment, it seems reasonable, if not logical, that these standards should be employed for data communications.[10]

Thus, these standards, which were presented to the Subcommittee for the first time on January 27, were adopted with minimal public deliberation and without time for interested parties to review the standards. In short, they were adopted solely because the Subcommittee felt it was "under the gun" from the FCC to do *some*thing, and because these standards were the "only game in town."

As a result, any "consensus" that may have been reached during the meetings was not the result of considered deliberation. This goes against the FCC's mandate to the NCC, which calls for the NCC to take an active and deliberative role in making recommendations. As the FCC stated in the First Report and Order, WT Docket No. 96-86, "We further will require the National Coordination Committee to monitor industry standard-setting activities, including those described above [i.e., Project 25 Phase I and

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[8] Id., pg. 4.

[9] Remarks of Kathleen Wallman, Chair, NCC, meeting of NCC Subcommittee on Technology, San Francisco, California, January 27, 2000, Minutes, pg. 26.

[10] Remarks of Robert Schlieman, meeting of NCC Subcommittee on Technology, San Francisco, California, January 27, 2000, Minutes, pg. 5.

Phase II], and use the information learned to recommend a set of voluntary technical standards for digital modulation to be used on the nationwide interoperability channels."[11] While the FCC subsequently clarified that the NCC would not itself have to become ANSI-certified but could instead adopt ANSI or like standards, it did not relieve the NCC from properly performing its deliberative, active role:

> We agree that allowing the NCC to make use of the work of other ASDs would offer the benefits of increased efficiency and improved use of NCC resources. The NCC could take advantage of these options in several ways, including by *reviewing and recommending* existing American national Standards, by *working with* one or more ASDs *to advance the progress of pending documents* toward their approval as American national Standards, or by entering into an agreement with one or more ASDs to *begin the process* of developing one or more new standards. The ability to employ one or more of these approaches would potentially save time by allowing the NCC *to build on standards work already accomplished* or by allowing other technical standards development work to begin immediately, ... In addition, allowing the NCC *to work cooperatively* with existing ASDs with expertise in the area of public safety communications ....[12]

Clearly, the FCC anticipated the NCC would "work with" ASDs and would "build on" existing standards in light of the FCC's mandate. Thus the FCC anticipated that the NCC would carefully consider any recommendations it might make to the FCC, and not simply pick whatever might be available. Unfortunately, the latter is what has occurred here, primarily as a result of the time crunch that the NCC felt itself to be under. The NCC should reassess its conclusions, allowing appropriate time for deliberation and comment, and work with ASDs as appropriate to facilitate standards development that will meet the needs of data interoperability, as discussed above. As stated in the PSWAC Final Report, "These [interoperability] standards and connections should be developed by a fair and open process that encourages industry to cooperate in order to provide the tools and technology needed by the Public Safety community."[13] That has not happened here. Two weeks is not enough time to allow fair and open cooperation among the various parties with need, knowledge and know-how in this field.

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[11] *Development of Operational, Technical and Spectrum Requirements for Meeting Fedearl, State and local Public Safety Agency Communications Requirements Through the Year 2010*, First Report and Order, 14 FCC Rcd 152 (September 29, 1998), para. 113.

[12] *Development of Operational, Technical and Spectrum Requirements for Meeting Fedearl, State and local Public Safety Agency Communications Requirements Through the Year 2010*, Order on Reconsideration, 14 FCC Rcd 8059, 8065 (May 4, 1999).

[13] *Final Report of the Public Safety Wireless Advisory Committee* (PSWAC), §2.2.11.3 (September 11, 1996).

Project 25 as a Data Standard is Largely Obsolete

The Project 25 protocol as a standard for data transmission is obsolete. The underlying standard itself is at least seven years old. As a result, it does not take account of the tremendous advances in data communications that have occurred over the past seven years. In many respects, the standard is backward looking. It was designed to accommodate analog systems, and in this regard alone makes little sense for data transmissions. Moreover, it was written originally for voice transmissions, and that is probably all it is useful for today. It provides a meager 9600 bps raw bit rate in 12.5 kHz channels, which will not promote creative, efficient use of the spectrum. In spite of the recently adopted interim "data suite" of accompanying standards intended to "shoehorn" the Project 25 standard into the world of data, it is, for purposes of data transmissions, an outmoded throwback to a bygone age when data played a small role compared to what data can do today, and will do a few years hence.

In the near future, we can count on users and application software providers to find creative uses for this spectrum that will not work well with the low efficiency and bit rate contemplated by the Project 25 standard. Such new applications and networks will not react well to being throttled down to 9600 bps. It is more than likely that such data networks will simply not be accessible at the low efficiency levels of the Project 25 standard. Certainly, users are not likely to flock to such a standard, nor are software developers or systems designers likely to focus their efforts on working to meet such a low efficiency standard.

In essence, adopting the 7-year-old Project 25 standard for data interoperability is akin to establishing a computer network today based on an old "286-type" chip. The network could function, but it would be generations out of date before even becoming operational. It would not be able to run many of today's applications or to operate with emerging peripherals. It would have very low functionality. This is not the direction the NCC should be taking for data interoperability.

Unfortunately, there is not enough awareness of the NCC's work on the part of many groups of Public Safety technologists from the Information Systems and Application Software arena. Such groups could play an important and useful role in creating a relevant and sound standard for full-fledged data interoperability. Proceeding without such input, and simply adopting an obsolete standard for data on the grounds that it is the only "standard" available is a mistake. We respectfully suggest that the NCC reach out to such groups and seek their input in moving forward.

On the other hand, it simply is not necessary for the data interoperability standard to be the same as the standard adopted for voice interoperability. The two can be easily separated, with one standard being recommended for voice, and another, still to be developed, being recommended for data. Indeed, it is logical that the standards would not be the same, since the two uses, in both theory and practice, are quite different and discrete. Importantly, data uses are still developing and evolving; it would be a mistake

to hamstring their future development by imposing on them a backward looking standard such as Project 25.

Project 25 Does Not Fulfill the FCC Mandate

In its *First Report and Order*, more than 18 months ago, the Commission clearly rejected the Project 25 Phase I standards that the NCC now recommends:

> Although it is clear that digital modulation standards must be adopted for the narrowband and wideband interoperability channels, we find that it would be premature to do so at this time. In regard to the interoperability wideband (image/HSD and video) channels, industry standard setting activities such as Project 34 are presently in early stages; consequently we do not have information on the record to adopt a digital standard for these applications. *We decline to adopt the Project 25 Phase I standards for the 700 MHz band because we intend that this band ultimately be used with a spectrum efficient 6.25 kHz technology (Project 25 Phase I is a 12.5 kHz standard).* We note that the Project 25 body has begun a promising Phase II process looking toward a digital standard for 6.25 kHz channels, and it appears that this process will also consider possible alternative technologies that provide equivalent spectrum efficiency with wider emissions.[14]

The rejection of the Project 25 standard was reiterated by Mr. Sugrue in his remarks during the NCC's January meeting:

> As you know, the Commission segmented the 700 MHz narrowband spectrum into 6.25 kHz channels. We did this in the expectation that the technology necessary to accommodate one voice channel in a 6.25 kHz bandwidth will be developed and will be suitable for public safety's purposes.
>
> Now, we may not be there yet. But I think it is important to keep this goal in mind as we address these issues. Technology changes rapidly.[15]

Obviously, in recommending the Project 25 Phase I standard, the NCC is not fulfilling its clear mandate to work towards a 6.25 kHz standard.

Mr. Sugrue stated further, "What I think the Commission would find most valuable from you in February is a recommendation for standards that represent the latest

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[14] *First Report and Order*, at para. 113 (emphasis added).

[15] Remarks of Thomas Sugure, Chief, Wireless Telecommunications Bureau, as delivered to the meeting of the Public Safety National Coordination committee, January 14, 2000, Washington, DC.

in today's technology and that have a clear, timely and realistic migration path to more spectrum-efficient technology in the future."[16] As discussed above, the Project 25 recommendation for data does not reflect the "latest technology." While it may be the only "standard" that is available at this time, it is an obsolete standard for data purposes.

Moreover, the NCC has neither deliberated nor explained how data interoperability would be migrated from Project 25 to a 6.25 kHz standard at some time in the future. This leaves a serious gap in the recommendation. It can not be assumed that migration of data interoperability from an obsolete standard could be accomplished in a cost-effective manner simply because 6.25 kHz is half of 12.5 kHz. Some pathway for future migration should be discussed and determined before adopting the Project 25 standard for data.

Conclusions

Dataradio recognizes that the recommendations are not the final ones, but some plan towards finalizing the recommendations, i.e., filling out the missing pieces of the standard and facilitating a pathway for migration to a more efficient standard, needs to be determined. The NCC must develop a plan to solve this dilemma, as without it there will be no reasonable way to judge a timetable for completing the NCC's tasks.

We urge the NCC to revisit it's methodology, process and conclusions regarding interoperable data and to consider reorganizing the effort to determine best what should go into a standard and how to achieve true industry representation. Indeed, as observed by Mr. Sugrue, "the public safety community will be best served if the recommendations you adopt result in vigorous competition among manufacturers."[17] Dataradio has previously advised the NCC that Dataradio is willing and able to work with the NCC towards these goals. What is needed is specific understanding of the needs and task list for achieving those needs, and this has yet to be addressed except in the most general sense. Through such a process, the NCC can move forward to develop a true interoperable data standard (both narrow and wide bands) that will serve as a workable tool for the Public Safety community.

[16] Id.

[17] Id. One issue with the Project 25 standards is that some features may be proprietary. PSWAC ISC Final Report, Appendix C.